

GIS Update

A newsletter about NJDEP's Geographic Information System

Issue #31, Spring 1997

New CD Provides Complete GIS Toolbox for Local Organizations

The first in a second series of CD-ROM products has been developed by staff of the GIS Program and is being released as the centerpiece of the NJDEP 1996 Annual Report. This CD fulfills a long term goal of providing a complete starter kit which will reach many organizations and individuals throughout New Jersey. DEP Commissioner Bob Shinn sets the tone for the CD in his opening remarks:

"When I came to DEP as Commissioner in 1994 I set a goal to empower local officials by giving them integrated natural resource and environmental regulatory information that would help them make prudent decisions. I saw our Geographic Information System as the technology to achieve that goal. Today I am excited to share with you the reality of that vision - a new way for citizens to understand New Jersey's environment and to participate in protecting it."

The CD, developed entirely with in-house staff resources, contains several components utilizing technology which work together to educate non-GIS professionals about the power of GIS and spatial data to solve practical problems. It also integrates many DEP digital layers allowing the user to build interactive environmental profiles for every New Jersey county, and provides reference information documenting how the use of GIS is expanding across the State.

One section on the CD contains four self-running narrated demonstrations, each highlighting different applications including an overview of the state, watershed management, brownfields, open space, and specific site information. These demos are particularly helpful for showing the power of GIS to decision makers such as managers, local mayors, county freeholders, etc. Another module provides a guided tutorial so users can feel comfortable exploring the GIS software included with the CD. The GIS software manipulates digital data which is contained in another module called "GIS County Profiles." These county profiles allow users to gain understanding about natural resources and other kinds of environmental information in their communities through easy viewing and analysis. The final section of the CD allows users access to the 1997 *NJ GIS Resource Guide*. The *Guide* is provided as a resource for users to learn more about the basics of GIS technology, GPS technology and most importantly, a reference to identify other organizations using GIS in the New Jersey area and an inventory of geospatial data. This document can be viewed with a web browser (Internet Explorer is provided on the CD) and is marked with hypertext, allowing easy navigation.

For the first time we have a toolbox of critical GIS elements (software, data, training, educational demos, and

a directory of users and data) in one easy to use product that can serve as a starter kit for anyone who has a multimedia PC. This latest CD will be included with the NJDEP Annual report which is distributed to approximately 2,500 recipients including local mayors, county freeholders, state legislators and congressional representatives, and the Governor's cabinet. In addition a copy of the CD is being provided to attendees of the 1997 GIS Conference co-hosted by the NJ State Mapping Advisory Committee and the Mid-Atlantic Chapter of URISA. (See *article below*.) Copies can be purchased for \$30 through the NJDEP Map Sales Office at (609) 777-1039.

Submitted by Hank Garie, OIRM

Annual GIS Conference Reflects Continued Growth

On March 19 and 20 the Mid-Atlantic Chapter of URISA and the New Jersey State Mapping Advisory Committee hosted the Annual GIS Conference and Workshops. The theme of this years event was *Put GIS in Your Toolbox* with presentations focusing on the diversity of ways GIS can help in solving everyday problems. The event continues to grow in popularity, this year drawing over 400 people.

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The BGIA looks at

MapObjects

to lighten the application load

MapObjects is a software package that consists of a set of software components that allow programmers to create customized interfaces for maps. The idea behind component software is to break the functions of a large desktop application (e.g., ArcView) into components. The application developer can stitch these components together to build a specific application. The components are called objects. The tools available to put these components together include most visual programming languages: Microsoft Visual Basic, Borland Delphi, Visual C++, Power Builder and a few others. Within the GIS bureau, we will be developing applications using Microsoft Visual Basic.

This end result will be smaller, faster and portable programs designed for a particular use, without the excess baggage (high memory, disk usage) required for a full application such as ArcView.

GIS and the Intranet/Internet

GIS technology, as with all software, moves at a fast pace. At the DEP we are exploring some of the new technology that allows users to access GIS programs over an intranet and the internet. (An intranet is the Wide Area Network that has restricted access, meaning network services are only available to users within that network, within the DEP, for example; the internet provides unrestricted global access from anywhere.)

MapObjects Internet Map Server

MapObjects Internet Map Server is a product which allows programmers to create dynamic maps and make them available through a web site. This means that programs that are created in MapObjects can be developed as web pages for public access to data or for analytical use within the DEP, without having to install the application software on each machine. The application will run locally on an internet map server and the client will access the program through an internet web browser.

The client interface can be developed using standard HTML, java or ActiveX technology. HTML is Hyper Text Markup Language, which is the simplest interface. The limitation of HTML is in the fact that it is static in nature, so each change requested will result in a new screen. The advantage of HTML is that any client browser can access the application. Java is a programming language developed by Sun Microsystems that is platform independent, so that it can run on any machine. Client interface programs that are developed in java are downloaded to the client machine and run locally, allowing for a more dynamic interface. The map server still handles all of the map requests, but the other components are handled by the browser. The disadvantage of java is that not all browsers support java and performance can be slow, depending on the resources of the client. Finally, ActiveX is a technology developed by Microsoft that is similar to java in that it is a component object that is run locally on the client, but the only platform that it runs on is Microsoft windows.

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GIS Conference

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An enlightening keynote address was given by John Bossler, Director of the Center for Mapping at Ohio State University. John shared his vision of where GIS technology is headed in the future.

The event was planned to meet the diversity of needs of the rapidly growing GIS community in the region. The attendees had a variety of formal and informal information gathering alternatives available to them. Four pre-conference workshops were held, which provided hands on experience in GPS,

the Internet, GIS for Decision Makers and an Introduction to GIS. The one day Conference was packed with competing choices for the attendees. Information could be gained through paper presentations in four parallel tracks; introductory level topics, integrating technology, policy issues and GIS applications. In addition to presentations, a complete vendor exhibit ran throughout the day providing an opportunity to meet one on one with the vendors and become familiar with new products and services available. The Users Helping Users session was a popular feature. It provided an informal setting where GIS users could share their GIS project experiences.

Another conference highlight was the sneak preview of DEP's latest GIS CD. This CD contains self-running GIS demos, interactive GIS components with software and data for each New Jersey county and the 1997 New Jersey GIS Resource Guide. The attendees were very excited to learn that they would all receive a copy of this CD as part of their registration. The Annual GIS event was once again a success, bringing people together to learn about this powerful technology and encouraging and inspiring people to work together to push it to its limits.

Submitted by Pat Cummings, BGIA

Upclose.....but not too personal

DEP's Endangered and Non-game Species Program (ENSP) within the Division of Fish, Game and Wildlife has been using GIS and GPS technology over the past several years for critical habitat mapping and species location tracking. Recently the Update editor had a chance to speak with ENSP's Jackie Arnold and Mandy Dey about their work within the program and, particularly, how GIS and GPS are being employed.

A major initiative for ENSP in the 1990s has been the Landscape Project, a comprehensive plan for the protection of rare species in New Jersey based on the emerging science of landscape ecology. Landscape ecology focuses on the relationship between organisms and their environments with emphasis on the larger region, or landscape, in which these communities occur. New Jersey, although a small state in comparison with others, is very rich in biological diversity. The goal of the Landscape Project is to preserve this diversity through protection of critical habitat areas which are home to many species of organisms.



Mandy Dey...in the field (or swamp)

Over the last twenty years many bird species, especially those that overwinter in Central and South America, have suffered serious declines from loss and fragmentation of habitat due to tropical deforestation and suburban sprawl. In response to this decline, wildlife biologist Mandy Dey has been coordinating an effort to map and analyze migratory songbird breeding populations distributions in southern New Jersey.

Surveys were conducted to determine the habitat, location and abundance of bird species. Mandy used a GPS receiver to field verify DEP landuse data and to collect additional data on habitat. Locations and data from the bird surveys have been converted to a GIS data layer and displayed in Arc-View. In addition to this data, ENSP has contracted with Rutgers University Center for Remote Sensing to produce a comprehensive statewide landuse layer using satellite imagery that will further aid the inventory of critical habitats.

As more survey and habitat data is collected Mandy plans to use the GIS to analyze species-habitat relationships and examine dispersion of particular habitats throughout the southern New Jersey landscape. This analysis will help ensure that the most critical lands are targeted for protection.

Jackie Arnold recently joined ENSP as a GIS biologist after completing an eight month student internship with the Bureau of Geographic Information and



Jackie Arnold with nationally known friend

Analysis. As an intern Jackie worked on the Department Integrated Facility File GPS project, collecting and processing DEP permitted facility location data for Department-wide use on the GIS.

Jackie is currently lending her GIS expertise to the Landscape Project by using the digital imagery and landuse data to help determine and map critical habitat areas. Many of the field biologists in ENSP rely on Jackie to turn their locational and survey data into a mapped format on the GIS where it can really "come alive". Species tracking and dispersion patterns can readily be seen when mapped, and interpretation of the data is enhanced when one begins overlaying additional GIS layers such as landuse, soils or aerial photography.

Jackie has also been working on updating a colonial water bird data layer from fly-over observations that were recorded on USGS topoquads. New polygons are digitized by student interns and then sent to Jackie for further attribute coding and processing.

If you would like to talk to Mandy or Jackie about their projects call the ENSP office at (609) 984-9400.

Accessing DEPVVIEW and other ArcView projects on the PC through your LAN

The BGIA has developed a customized ArcView project called DEPVVIEW which features a simplified graphical user interface (GUI) along with the *Theme Selector* and *Municipality* buttons. The *Theme Selector* displays a pulldown menu of over seventy data layers from which to select, and the *Municipality* button allows the user to quickly zoom to the geographic area of interest.

DEP staff wishing to access DEPVVIEW through their LAN connection should do the following:

1. Request the ArcView 3.0 software from the BGIA, and load it on your PC. (Copies of the ArcView software were purchased by the BGIA, and there is no cost to your program. See NJ GIS Update issue #30 for details or call the GIS Help Desk at 777-0672.)

2. Map four available PC network drives to the following GIS (UNIX) directories: DEVELOP, DATA, IMAGES and GEOHOME. (If you have trouble seeing the GIS directories ask your LAN administrator for help. If the problem persists contact the GIS Help Desk.)

3. Edit your PC's autoexec.bat to set the following variables that represent the GIS (UNIX) directories that correspond to the mapped PC drives. (**Make sure to substitute the appropriate letter drives that your PC is mapped to.**)

```
SET DEVELOP=f:
SET DTHOME=g:      (corresponds to DATA directory)
SET RDHOME=g:\rdsinfra  (corresponds to DATA directory)
SET IMAGES=h:
SET GEOHOME=i:      (corresponds to GEODATA directory)
```

4. Restart the PC, open ArcView and under the File Menu select "Open Project." Select the DEVELOP drive and double-click on depview.apr to open. The project should open with a state-wide view of the counties. "Where is...." messages on the screen indicate that either PC drives are not mapped properly to the GIS directories or that variable names in the autoexec.bat have been misspelled or omitted. Cancel out, recheck and try again. Call the GIS Help Desk if the problem persists.

Other general access ArcView applications under the DEVELOP directory that can be accessed once drives are mapped and variables set are:

avplus.apr - the standard ArcView interface with the Theme Selector and Municipality buttons plus buttons and tools that merge themes and tables together; convert latitude and longitude files to state plane shape files; return latitude and longitude for a selected location on a view; add fields and calculates areas, perimeters and lengths for theme features; buffer point, line and polygon features: and create piechart symbols based on values in a field.

Map Objects

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While this may be a good technology for use within an intranet (where everyone is using a standard platform, e.g., Microsoft Windows), it is not a very good technology for internet use-where there will be a wide variety of user platforms accessing the web site.

ArcView Internet Map Server

Soon to be released is the Arcview Internet Map Server. This is similar to the MapObjects Internet Map Server, except that it will have many of the features of ArcView already developed. This will make ArcView applications available through an intranet or the internet. As with MapObjects, the client interface can be built using HTML, java or ActiveX. To view some sample applications developed by ESRI, visit their homepage at <http://www.esri.com>.

The future task of the GIS bureau will be to develop interactive mapping applications for use within the Department and to bring information to the public via the internet. Creating interactive maps with the wide array of developer choices should prove both challenging and rewarding.

Submitted by Paul Anderson of the BGIA

County Profiles - twenty-one ArcView projects with pre-designed views for each of New Jersey's counties. Found in the DEVELOP/profiles directory.

sitelook.apr - designed for the Bureau of Community Relations to locate addresses and identify hazardous waste sites located within a given distance of that address.

BGIA's one-day GIS class trains DEP staff in the use of DEPVVIEW and the County Profiles. Contact training coordinator Angela Witcher at 633-2169 for more information.

Database News

Scanned topoquad grids

/space/topoquads/files/finals
/space/topoquads/files/finals2

Scanned topoquad grids are now available on the GIS server. These images are black and white ArcInfo Grids, which have been projected to state plane feet, NAD83. The pixel resolution is about 5 feet. Hunter College scanned the topoquads for EPA Region II and EPA distributed the images as TIFF files to the NJDEP. The topoquads are from varying years, were scanned from paper maps, and were not accompanied by Data Dictionaries, so care must be taken in using these Grids.

The Grid format was chosen because it is very simple to display Grids in ArcView and turn the background from white to transparent. This allows the user to see through the image and display data behind the topoquad features. To use topoquads in this manner first add a topoquad to the view. Turn the image on. Highlight the image in the table of contents then double click on the highlight to bring up the Image Legend Editor window. Click on the Colormap option. The Image Colormap will be displayed. Colormap 1 is white. Double click on the white box to bring up the Color Palette window. Change the foreground from white to transparent (clear). Next scroll to the end of the list on the Image Colormap window, and double click on the Nodata color and change it to transparent in the Color Palette window. Click Apply in the Image Colormap window. Now the grid will display as a transparent image with only the black features showing.

You may notice when first drawing the Grid that there are black edges around the

image. This is a result of projecting the images from UTM to State Plane Feet. Even though these images were edge matched, the edge is not as discrete as a digital photoquad image and some Nodata cells do exist at the edge of each topoquad image. These bands of cells are generally very narrow and not significant except from an aesthetic point of view. By changing the Nodata cells to transparent, the edge cells become invisible. The topoquads can then be edgematched together without a degradation in image quality.

The Grid images are presently located under */space/topoquads/files/finals* and *finals2*. If they are moved, a message will appear at the login. Thanks to EPA Region II for providing this source data to NJDEP.

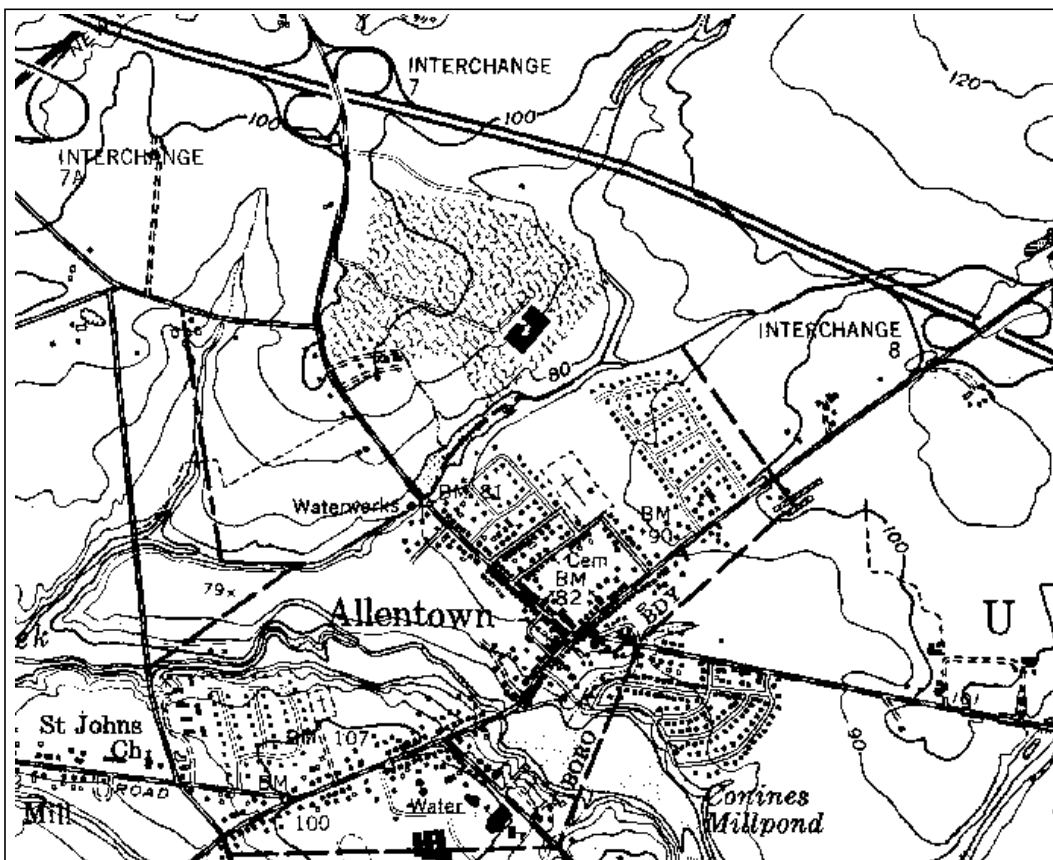
Submitted by Larry Thornton, BGIA

Watershed Management Areas

/geodata/watershd/depwmas
/geodata/watershd/metadata.txt

A new and improved watershed management areas coverage is available from the NJ Geological Survey GIS server at the above pathname. A corresponding data dictionary file called *metadata.txt* is available as well. For those using the DEPVUE customized ArcView project select on "Watershed Management Areas" from the Theme Selector.

The coverage contains five watershed management regions which can be classified using the WMREGION field and twenty watershed management areas which can be classified using the WMAREA field. The WMNAME field holds descriptive names based on the major river or river system for each of the management areas.



A portion of the Allentown topoquad grid is shown here.

Paul Anderson joins BGIA

The Bureau of Geographic Information and Analysis recently welcomed Paul Anderson to the staff. A DEP employee since 1991, Paul brings to the group a strong background in GIS and programming - a definite benefit as the BGIA enters the world of internet map applications. Paul arrived just in time to help with some critical components of the Bureau's recent CD production and then jumped right into the challenge of programming with MapObjects (see article on page 2). Paul can be reached at 292-9985.



GIS CD Products available from NJDEP Map Sales Office

Here is a summary of the CDs that are available for purchase from the DEP Map Sales Office (609) 777-1039. Contact the BGIA at (609) 984-2243 for a detailed information sheet on the CDs. Each CD is \$30 and checks should be made out to *Treasurer, State of New Jersey*. Send to:

NJDEP Map Sales
Bureau of Revenue
CN417
Trenton, NJ 08625-1417

Series #1 GIS Resource Data

Each CD in the first three volumes in this series contains approximately 35 coverages in Arc/Info EXPORT format. Landuse, political boundaries, coastline, hydrography, floodprone areas and soils are among the data layers available on each CD. The tidelands and landuse with wetlands data on Volume #4 is provided in both Arc/Info EXPORT *and* DXF formats. *Please note that no software is contained in this series.*

Volume#1: Southern New Jersey Data for Atlantic, Camden, Cape May, Cumberland, Gloucester, Salem

Volume#2: Central New Jersey Data for Burlington, Mercer, Middlesex, Monmouth, Ocean, Somerset

Volume#3: Northern New Jersey Data for Bergen, Essex, Hudson, Hunterdon, Morris, Passaic, Sussex, Warren, Union

Volume#4: Statewide Riparian Claims (Tidelands) and landuse/landcover integrated with fresh water wetlands

Series #2 GIS tools for Decision Making

Volume#1: GIS Tools for Decision Making Contains GIS self-guided demonstrations, the 1997 NJ GIS Resource Guide, and sample GIS software packaged with county environmental data. See the front page article for more information.

Questions about DEP's GIS?



Call the GIS Help Desk at 777-0672

New Jersey GIS Update

issued quarterly by the

NJ Department of Environmental Protection
Office of Information Resources Management
Bureau of Geographic Information and Analysis
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Stockton offers GIS/GPS short courses

The Professional Continuing Education Office of Richard Stockton College of New Jersey offers a suite of GIS and GPS two-day short courses. Students enjoy the benefits of Stockton's new state-of-the-art GIS facility. Engineers, land surveyors, environmental consultants, planners, health officers, environmental educators and anyone interested in GIS/GPS technology are encouraged to attend. The registration fee is \$175 for each course. Call the Office of Lifelong Learning at (609) 652-4227 for more information.

2-day Courses

ArcView

Global Positioning Systems

Data Creation using Arc/Info

Data Analysis and Manipulation using Arc/Info

Advanced Applications in Arc/Info

== GIS Events ==

UCGIS Annual Assembly and Summer Retreat

June 15-21, 1997 in Bar Harbor, Maine

The University Consortium for Geographic Information Science is a non-profit organization of universities and other research institutions dedicated to expanding and strengthening geographic information science. For more information contact conference co-chair, Harlan J. Onsrud, at (207) 581-2175.

17th Annual ESRI User Conference

July 8-11, 1997 in San Diego, California

The San Diego Convention Center is the new site and July is the new month for this year's conference. For information go to the ESRI home page at www.esri.com or call (909) 793-2853 ext. 1-1363.

NSGIC

September 12, 1997 in Welches, Oregon

The National States Geographic Information Council will be holding its 7th Annual meeting at the Resort at the Mountain in Welches, Oregon. For more information call (603) 643-1600.

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NEARC97

September 28-October 1, 1997 in Long Branch, New Jersey

The New Jersey County GIS Users are hosting the 1997 Northeast Arc Users Group Meeting at the Ocean Hilton in Long Branch. A call for papers will be mailed in May. For information contact Bob Berardo at (908) 431-7840 or go to the conference home page at www.crssa.rutgers.edu/

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